CORRES CONTROL
INCOMING LTR NO

7604/RF 94

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RNIVAL, G J		
ORDOVA, R C		
VIS, J G		
RRERA, D W		
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EIS, J A		
OVER, W S		
OLAN, P M		
ANNI, B J		
EALY, T J		
EDAHL, T G	X	
ILBIG, J G		
UTCHINS, N M		
ACKSON, D T		
ELL, R E		
UESTER, A W		
ARX, G E		
McDONALD, M M		
McKENNA, F G		
ORGAN, R V		
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TOBIN, P M		
VOORHEIS, G M		
WILSON, J M		
Porter G	X	

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ADMN RECORD/080		
PATS/T130G		

Reviewed for Addressee
Corres Control RFP

7/1/94 DATE — BY

Ref Ltr #

DOE ORDER # 5400.1

RF 46522 (Rev 6/94)

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Department of Energy

ROCKY FLATS OFFICE
P O BOX 928
GOLDEN COLORADO 80402-0928

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Mr Gary Baughman
Facilities Section
Hazardous Waste Control Program
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Gentlemen

As discussed in the June 9, 1994 informal Pond Water Management Interim Measure/Interim Remedial Action (IM/IRA) Administrative Control meeting, enclosed are short descriptions of possible short and long-term administrative control options

A meeting has been set for July 6, 1994 from 1 00pm-4 00pm at Interlocken in the large west conference room to discuss these options Enclosed is a proposed agenda for this meeting If you have any questions or comments regarding this submittal please call me at 966-3424 or Annette Marquez at 966-6247

Sincerely,

Gail S. Hill

Gail S Hill, Acting Director
Environmental Guidance Division

Enclosure
ccw/o Enclosure
S Olinger, AMESH, RFFO
D Lindsay, OCC, RFFO
A Marquez, EGD, RFFO
T Anderson, SSD, RFFO
G Litus, SSD, BAI
J Pepe, ER, RFFO
G Porter, SWD, EG&G
B Fraser, EPA
R Shankland, EPA
S Tarlton, CDH
J Bruch, CDH
J Schieffelin, CDH

JUL 1994 RECEIVED RECORDS CENTER

ADMIN RECORD

A 0005-000688

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DRAFT
POND WATER MANAGEMENT
IM / IRA
POND MANAGEMENT ALTERNATIVES

4B100

1 0 SHORT TERM ALTERNATIVES

1 1 Batch Discharge with Increased Dam Monitoring

Purpose

To isolate Rocky Flats Plant surface water in Pond A4 for analysis prior to off-site discharge This provides the maximum assurance that Segment 4 Standards are met during discharge

Description

Detain storm water runoff and WWTP effluent in Ponds A-3 and B-5 Transfer A-3 and B-5 to Pond A-4 for isolation prior to pre-discharge sampling Detain water until all sample results indicate compliance with Segment 4 standards Increase dam safety monitoring and inspections to accommodate increased pool volumes in associated ponds

Operational Components

Terminal Ponds
- Pond A-3 operating capacity Normal (6 2 Mgal, 50%), Non-routine (12 4 Mgal, 100%)
- Pond B-5 operating capacity Normal (12 0 Mgal, 50%), Non-routine (15 6 Mgal, 65%)
- Pond A-4 operating capacity Normal (16 3 Mgal, 50%), Non-routine (21 1 Mgal, 65%)
- 32 to 38 day discharge cycle
- 212 water quality parameters analyzed per pond prior to release
- Maximum draw down rates for Ponds A-4 and B-5 are one foot per day

Interior Ponds
- Allow interior ponds sediments to become temporarily exposed and stabilize pond bottoms area by re-vegetating / hydromulching with grass species mix
- Maintain interior ponds for emergency spill control response
- The Landfill Pond will be transferred to Pond A3

Water Balance
Under the current operational parameters, seasonal hydrologic conditions will periodically require future release of water that is not "batched" These releases will be performed using the procedures described in the Water Detention Pond Dam Failure Procedure

• System is susceptible to significant storm events Maintaining elevated pool levels in the ponds decreases the system capacity to detain high flows associated with seasonal storm events and increases the volume of water to be treated in the case of an potential spill

Considerations

• Fluctuation of pool volumes and long term detention of water are subject to the regulations of the Migratory Bird Treaty Act and the Endangered Species Act
• Pond water quality is dynamic during "batching" process Exceedances of Segment 4 standards (pH, iron, manganese, aluminum) may result from the operation
• Historical water quality data is used to assess emergency releases of water
• Water Rights Assessment

Schedule

Implementation of this alternative - Current (1 Month)

Cost Estimate

• Pond Operations	1000K
• Water Quality Analyses	500K
• Dam Safety	900K (Increase 1 FTE)
Total Annual Cost ≈	2400K

1 2 Spray Evaporation/Spray Irrigation

Purpose

To reduce the volume of storm water runoff and WWTP effluent discharged from the Rocky Flats Plant This will allow for more effective "batch" discharges of excess water Segment 4 water quality concerns for evaporated or irrigated water may not apply

Description

Construct spray evaporation systems at interior and terminal ponds to reduce the volume of water requiring discharge during optimal conditions (April through October) Construct spray irrigation systems in appropriate locations to further reduce the amount of water within the pond management system

Operational Components

Terminal Ponds
- Operational components will be derived from the Zero Discharge Study
- Discharge of excess water will be consistent with Alternative 1 1

Interior Ponds
- Maintain interior pond volumes from 10 percent to 25 percent capacity full to reduce sediment displacement by wind Interior pond water will be either evaporated or transferred to terminal ponds based on water quality and hydrologic conditions

Water Balance
Optimal operational condition for irrigation and evaporation activities exist from April through October The accumulation of water during the peak inflow periods (spring) will strain the effective operation of evaporation systems Large land areas will be required to operate irrigation systems during peak periods Under the current scenario, seasonal hydrologic conditions will likely require periodic discharges of water that may be or may not be "batched" These releases will be performed consistent with Alternative 1 1 or procedures described in the Water Detention Pond Dam Failure Procedure

- System is susceptible to significant storm events Ponds with high pool levels have less capacity to detain increaed flows associated with seasonal storm events and potential spills
- Alternative water management options required November through April and possibly during high precipitation periods

Considerations

- Creation of wetlands and consumption of water are subject to the regulations of the Migratory Bird Treaty Act and the Endangered Species Act
- Potential for release of contaminants through the air pathway
- Potential for concentration of inorganics
- Creation of wetlands
- Alternative water management options required November through April and possibly during high precipitation periods
- Option would be improved with the availability of electric power at the ponds
- Potential for the creation of additional IHSS's
- Potential for return surface water runoff that exceeds Segment 4 standards
- Applicability of current standards

Schedule

Implementation of this alternative 1 Month to 12 Months

Cost Estimate

• Pond Operations	1400K (Increase 2 FTE)
• Water Quality Analyses	500K
• Dam Safety	800K
• Equipment Outlay	500K (10 Pumps Pipe & Sprayheads)
Total Annual Cost ≈	3200K

1.3 Direct Discharge WWTP to Segment 4

Purpose

Reduce volume of water input to pond system by approximately one third and emphasize the management of storm water runoff The quality of water discharged from the WWTP is regulated under the NPDES permit

Description

Treated effluent from the WWTP would be routed around Segment 5 into Segment 4 in compliance with the pending NPDES permit Physical and administrative controls on the WWTP abates the off-site discharge of contaminants

Real-time analytical equipment would be installed at the NPDES compliance point in addition to required NPDES sampling Data collection systems would be tied into the current telemetry network Real-time alpha, volatile organic analysis, pH, and other traditional water quality parameters would be used as indicators of potential upset conditions at the WWTP System alarms would be used to discontinue follow-through operations until the upset condition is confirmed or denied Detection capabilities for each of these instruments will be field investigated prior to implementation This would include intensive calibration requirements and occasional split sampling with on-site laboratory analysis

Water Balance

Approximately 50 million gallons of water will be diverted around the pond system yearly This is one third of the total inputs Detaining only storm water in the pond system will allow for more effective "batching"

Operational Components

Terminal Ponds

- Pond A-3 operating capacity Normal (6 2 Mgal, 50%), Non-routine (12 4 Mgal, 100%)
- Pond B-5 operating capacity Normal (12 0 Mgal, 50%), Non-routine (15 6 Mgal, 65%)
- Pond A-4 operating capacity Normal (16 3 Mgal, 50%), Non-routine (21 1 Mgal, 65%)
- 32 to 38 day discharge cycle
- 212 water quality parameters analyzed per pond prior to release
- Maximum draw down rates for Ponds A-4 and B-5 are one foot per day

Interior Ponds

- Treated effluent from the WWTP would be piped directly into Segment 4
- Real-time sampling would complement the required NPDES sampling
- Allow interior ponds sediments to become temporarily exposed and stabilize pond bottoms area by re-vegetating / hydromulching with grass species mix
- Maintain interior ponds for emergency spill control response
- The Landfill Pond will be transferred to Pond A3

Considerations

- Maintains flows to Walnut Creek This may be a positive aspect under the regulations of the MBTA and ESA
- Tertiary treatment at WWTP highly effective in removing particulates
- Administrative and physical controls in place at WWTP and in buildings
- There is a risk, though low, that upset conditions at the WWTP may not be isolated in the interior ponds and produce an exceedance of Segment 4 standards
- Increased coordination with Broomfield during maintenance and operation of the Diversion Ditch

Schedule

Implementation of this alternative 1 Month to 6 Months

Cost Estimate

• Pond Operations	800K
• Water Quality Analyses	500K
• Dam Safety	800K
• Equipment Outlay	100K (Real-time Monitoring and Piping Equipment)
Total Annual Cost ≈	2200K

1 4 Continuous Use of Current Treatment System at Pond A-4

Purpose

Provides continuous off-site discharges from RFP Existing system capable of effective treatment of particulate and selected volatile organic compounds This technology is only marginally effective for metals and radionuclide removal

Description

Utilize water treatment system at Pond A-4 to continuously treat storm runoff and WWTP effluent The system consists of primary filtration (10 μm), secondary filtration (0 5μm), and Granular Activated Carbon (GAC)

Operational Components

Terminal Ponds
- Uninterrupted discharges to Segment 4 with continuous treatment
- Eliminate pre-discharge sampling

Interior Ponds
- Allow interior ponds sediments to become temporarily exposed and stabilize pond bottoms area by re-vegetating / hydromulching with grass species mix
- Maintain interior ponds for emergency spill control response
- The Landfill Pond will be transferred to Pond A3

Water Balance
Ponds will be maintained at 10% capacity to allow for the detention of all storms that do not exceed design capacity

Considerations
- System would supply limited treatment Treatment capability would need to be added for metals, radionuclides, non-GAC organics, and/or water quality parameters as elevated concentrations of specific analytes are found
- Ecological concerns with fluctuations in pond levels and intermittent discharges would be minimized
- Reservoirs maintained at low levels would be available to collect significant storm or emergency events
- Waste generation would be significant
- The issues of low level radioactive waste generation and disposal must be resolved
- The issues of RCRA waste generation must be defined

Schedule

Implementation of this alternative 1 Month to 6 Months

Cost Estimate

• Pond Operations	1000K
• Water Quality Analyses	500K
• Dam Safety	800K
• Equipment Outlay	300K (Filters & GAC media replacement)
• Waste Gen & Disposal	900K
Total Annual Cost ≈	3500K

1 5 Flow-Through Discharges with Real-Time Monitoring

Purpose

To maintain low pool volumes that allow adequate pond capacity to effectively detain, analyze, and treat if necessary, surface water with the highest potential for contamination, i e , spill events and storm water from significant events This alternative utilizes routinely collected water quality data to assess the quality of discharged water

Description

Controlled "flow-through" discharge from outlet works of Pond A-3 through A-4, and through Pond B-5 This includes the evaluation and installation of real-time monitoring

Real-time analytical equipment would be installed at the NPDES compliance point in addition to required NPDES sampling Data collection systems would be connected into the current telemetry network Real-time alpha, volatile organic analysis, pH, and other traditional water quality parameters would be evaluated as indicators of potential upset conditions at the WWTP System alarms would be used to discontinue flow-through operations until the upset condition is confirmed or denied Detection capabilities for each of these instruments will be field investigated prior to implementation This would include intensive calibration requirements and occasional split sampling with on-site laboratory analysis

Water Balance

Ponds will be maintained at 10% capacity to allow for the detention of all storms that do not exceed design capacity Detained water associated with storm events will not be held in a "batch" Rather, this water will be released after an appropriate time period Samples collected prior to release will be used to update the water quality data

Operational Components

Terminal Pond

- Discharge Monday through Friday during day shift only
- All discharges initiated only after confirming from Shift Superintendent report if any spills or upsets occurred during previous night
- No discharge during weekends and holidays, unless authorized
- Discharges terminated for 24 hour period after storm events greater than one-half inch or contributing greater than 15% increase to total pond volume
- Discharges terminated during confirmed emergency spill response or upset condition
- Discharges terminated when real-time monitoring indicators exceed normal operational range

Interior Ponds

- Allow interior ponds sediments to become temporarily exposed and stabilize pond bottoms area by re-vegetating / hydromulching with grass species mix
- Maintain interior ponds for emergency spill control response
- The Landfill Pond will be transferred to Pond A3

Considerations

- Ecological concerns with fluctuations in pond levels and intermittent discharges would be minimized
- Dams would be available to collect significant storm events
- Administrative controls and routine sampling identify upset conditions and assure good water quality

Schedule

Implementation of this alternative 1 Month to 12 Months

Cost Estimate

• Pond Operations	500K
• Water Quality Analyses	700K
• Dam Safety	800K
• Equipment Outlay	300K (Real-Time Monitoring Equipment for 5 Locations)
Total Annual Cost ≈	2300K

2.0 LONG TERM ALTERNATIVES

2 1 Purchase Great Western Reservoir and Incorporate into Ponds System

Purpose

To convert Great Western Reservoir to a terminal storage facility for final management of RFP surface water

Description

Use Great Western Reservoir as the *Great Terminal Pond (GTP)* to collect all non-spill event, flow-through waters from WWTP, Ponds A-4, B-5, and C-2, Woman Creek Reservoir Use appropriate ponds in each drainage to collect and segregate water for specific treatment of any significant spill or upset condition

Operational Components

Continuous Discharge of GTP with the potential for enhanced treatment from the Great Western Reservoir treatment plant

- Possible wetland construction for habitat enhancement and tertiary water treatment Use water from the GTP to construct and maintain RFP wetlands mitigation area adjacent to or in Great Western Reservoir
- Provide enhanced water treatment with existing, and upgraded if required, Great Western Reservoir treatment facilities and maintain to the extent possible continuous treated discharge to Walnut Creek

Considerations

- Effort would require coordination with the City of Broomfield through Option B and Operable Unit 3 activities
- Water Rights Assessment
- Federal purchase of property and facilities, i e property appraisal, environmental assessment, and audit
- CWQCC review of currently promulgated water quality stream standards
- Operation will be assessed by the US Fish and Wildlife Service for issues related to MBTA and ESA
- Coordination of operations with the management of the Woman Creek Reservoir

2 2 Increase Existing Ponds Capacity

Purpose

Provide increased permanent retention capacity to support detention of all water until complete sample results indicate full compliance with Segment 4 standards and written regulatory concurrence to discharge has been received through conduct of operations

Description

Rehabilitate Dams A-4, B-5, and C-2 to provide permanent increased retention capacity

Operational Components

- Expand the volumetric capacity of the terminal ponds while increasing upstream slopes of earthen dams
- Structurally modify dams to consistently retain a maximum capacity of 80 percent for greater length of time (minimum 45 days)
- Increase draw down capability to safely exceed the current one foot per day restriction

Considerations

- Excavation would disturb existing sediments
- Excavation would require installation of coffer dams and water diversion during the construction period
- Water Rights Assessment
- Conceptual design study performed prior to Title I
- Long term plans to detain water will be subject to the regulations of the MBTA and ESA

Schedule

Implementation of this alternative FY95 through FY99

Cost Elements

- Construction cost - $ 15 million (preliminary estimate)
- Water Rights
- Potential NRDA costs

Schedule

Implementation of this alternative after completion of selected Option B alternatives and in coordination with Operable Unit 3 schedules

Cost Elements

- Water Rights
- Property and facilities purchase
- New administrative and operational requirements
- Wetlands construction
- Maintenance requirements
- Potential water treatment plant modifications

2 3 On Site Water Consumption to Minimize Off-site Discharges

Purpose

To approach zero off-site discharge to the extent practicable

Description

Develop on-site water consumption methods such as mechanical land application, spray evaporation, or wetland construction, to minimize future off-site discharges

Operational Components

A) Spray Irrigation of WWTP Effluent with Land Application of Sludge
- Create a land irrigation system to sustain vegetative cover that maximizes the consumption of water Design irrigation systems in accordance with discharge flow rates for the critical year
- Land apply WWTP sludge to enhance the productivity of the vegetative cover and eliminate the disposal of the sludge as radioactive waste

B) Wetlands Construction
- Create an on-site wetland to assure that annual wetlands evapotranspiration and reservoir evaporation is equivalent to the discharge flow rates

C) Recycle and Conservation
- Reconsider the merits of selected recycle projects
- Emphasize water use minimization

Considerations

- Coordination with the EPA Sludge Administration Program to determine the acceptability of sludge application at RFP
- Determination of a "non-radioactive" sludge concentration by DOE
- Water Rights Assessment
- Determination of sampling requirements prior to release to the environment
- Design to account for unfavorable weather conditions

Schedule

Implementation of this alternative in FY95 through FY99

Cost Elements

- Water Rights
- Construction costs (land application system, spray evaporation, wetlands)
- Maintenance costs
- Additional water and sludge characterization requirements
- New administrative and operational requirements
- Potential future remedial actions
- Potential NRDA costs

2 4 Treat All Discharges Through Enhanced A-4 Treatment System

Purpose

To ensure regulatory compliance by high quality, continuous off-site discharges from RFP

Description

The treatment facility at Pond A-4 would be enhanced to comply with all Segment 4 standards Currently the system consists of primary particulate filtration and granular activated carbon adsorption

Operational Components

- Uninterrupted discharges to Segment 4 with continuous treatment
- Eliminate pre-discharge sampling
- Provide consistent water quality

Considerations

- The treatment facility would require the addition of chemical mixing, flocculation/sedimentation and multimedia filtration to the current granular activated carbon adsorption system Further investigation may warrant different or additional treatment alternatives
- System would ensure high quality discharges
- Ecological concerns with fluctuations in pond levels and intermittent discharges would be minimized
- Dams would be available to collect significant storm events
- Waste generation would be significant Both RCRA and low level radionuclide issues must be addressed

Schedule

Implementation of this alternative in FY95 through FY97

Cost Elements

- Installation of additional treatment equipment (2000K one time cost)
- Waste handling and disposal (+$)
- Upgrading the current facility and designing the new additions to RCRA requirements
- Operational and maintenance costs (1200K annual cost)

2 5 Continuous Discharge with Enhanced Real-Time Monitoring

Purpose

To maintain low pool volumes that allow adequate pond capacity to effectively detain, analyze, and treat if necessary, surface water with the highest potential for contamination, i e , spill events and storm water from significant events

Description

Real-time analytical systems would be tied into the current telemetry network Real-time alpha, volatile organic analysis, pH and other traditional water quality parameters would be used as indicators of potential upset conditions at the WWTP System alarms would be used to discontinue flow-through operations until the upset condition is confirmed or denied This option would include intensive calibration requirements and occasional split sampling with on-site laboratory analysis

Operational Components

- Continuous discharge with real-time monitoring at Ponds A-3, A-4, B-5, C-2 and WWTP discharge
- Discharges terminated for 24 hour period after storm events greater than one-half inch or contributing greater than 15% increase to total pond volume
- Discharges terminated during confirmed emergency spill response or upset condition
- Discharges terminated when real-time monitoring indicators exceed normal operational range

Considerations

- Ecological concerns with fluctuations in pond levels and intermittent discharges would be minimized
- Dams would be available to collect significant storm events

Schedule

Implementation of this alternative in FY95

Cost Elements

- Additional real-time monitoring equipment as available
- Additional sampling for quality verification
- Equipment maintenance and calibration

Draft Pond Water Management IM/IRA Pond Alternatives

Current Operations

Batch Discharge using Pond A-4

2400K

Short-term Options

1.1 Batch Discharge with increased Dam Monitoring

1 Mo. 2400K

1.2 Spray Evaporation / Spray Irrigation

1-12 Mo. 3200K

1.3 Direct Discharge of WWTP Effluent to Segment 4

1-6 Mo 2200K

1.4 Continuous Use of Current Treatment System at Pond A-4

1-6 Mo. 3500K

1.5 Flow-through Discharges with Realtime Monitoring

1-12 Mo. 2300K

Long-term Options

2.1 Purchase Great Western Reservoir and incorporate into pond system

2.2 Increase Existing Ponds Capacity

2.3 On site water consumption to minimize offsite discharges

2.4 Treat all discharges through enhanced A4 Treatment System

2.5 Flow-through Discharges with Enhanced Real-time Monitoring